

Fill in the chart below

Equation	Period	Amplitude	Equation of Axis	Scenario
$y = 2\sin[3x - \pi] + 5$				
	6	9	$y=7$	
				A pendulum swings back and forth 10 times in 8s. It swings through a total horizontal distance of 40 cm.
$y = \cos[0.5x - \pi] - 1$				

**PRACTICE PROBLEMS**

10. The temperature of a swimming pool is cyclic and modelled by a trigonometric function. If its highest temperature is  $82^{\circ}\text{F}$  and its lowest temperature is  $76^{\circ}\text{F}$ , and it takes 12 hours for the temperature to change between its extremes, state the equation that models the temperature of the pool as a function of time in hours?
11. A mouse wheel is 16 cm in diameter and the base of the wheel is 2 cm off the ground. If the hamster can spin the wheel 4 times each second, what is the sine function that describes the movement of the wheel if it starts at its lowest point? What would change if it started at the highest point?
1. A wind turbine has three blades, each measuring 3 m from centre to tip. At a particular time, the turbine is rotating four times a minute. a) Determine the angular velocity of the turbine in radians second. b) How far has the tip of a blade traveled after 5 min?
  2. A wheel is rotating at an angular velocity of  $3.4$  radians/s, while a point on the circumference of the wheel travels 5 m in 10 s. a) How many revolutions does the wheel make in 1 min? b) What is the radius of the wheel?
  3. The members of a high-school basketball team are driving from Calgary to Vancouver, which is a distance of 675 km. Each tire on their van has a radius of 32 cm. If the team members drive at a constant speed and cover the distance from Calgary to Vancouver in 6 h 45 min, what is the angular velocity, in radians second, of each tire during the drive?
  4. The needle of a compass makes an angle of 4 radians with the line pointing east from the centre of the compass. The tip of the needle is 4.2 cm below the line pointing west from the centre of the compass. How long is the needle, to the nearest hundredth of a centimetre?
  5. A clock is showing the time as exactly 3:00 p.m. and 25 s. Because a full minute has not passed since 3:00, the hour hand is pointing directly at the 3 and the minute hand is pointing directly at the 12. If the tip of the second hand is directly below the tip of the hour hand, and if the length of the second hand is 9 cm, what is the length of the hour hand?
  6. A mass on a spring is pulled toward the floor and released, causing it to move up and down. Its height, in centimetres, above the floor after  $t$  seconds is given by the function
    - a. Sketch a graph of height versus time. Then use your graph to predict when the mass will be 18 cm above the floor as it travels in an upward direction.